



New Products, More Applications from Versatec

In this issue of Versatec's **HARD COPY** the focus is on the ever-widening use of Versatec equipment in graphics and computer aided design. Lockheed and TRW are discovering the benefits of speed and productivity with electrostatic wide plotters in the design of aircraft and spacecraft. Back here on earth, Versatec is assisting in a number of environment centered applications, featured inside.

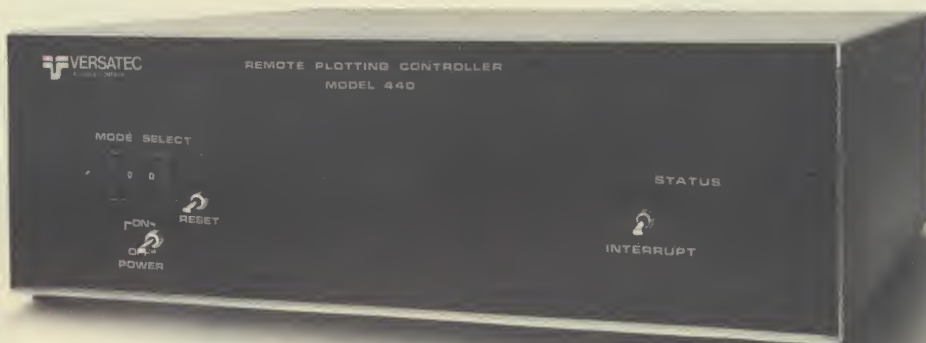
With this issue Versatec also announces its newest product, the Random Element Processor (REP). We believe the REP will revolutionize electrostatic plotting by off-loading the host computer during data ordering and raster conversion, saving users considerable time and money.

Two other products—Versatec's new Multi-Leave Remote Plotting Controller and the V-80—are discussed in this issue. With Versatec, success and growth go hand-in-hand, and the benefits to customers from our success are apparent in the article covering the growth and reorganization of our Supplies Division.

Is there more you'd like to know? We're waiting to hear from you. If you have questions concerning products or applications, let us know for the next issue of **HARD COPY**. ■

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New Versatec Controller Provides Remote Electrostatic Plotting



The new Versatec 440-30 Remote Plotting Controller, operating as a HASP multi-leaving remote job entry (RJE) work station, provides remote electrostatic plotting and printing with any Versatec printer/plotter. Input data is processed and compressed, then transmitted over dial or leased lines in compressed raster format to the controller. The Versatec controller decompresses raster data and controls plotting or printing.

Versatec Versaplot™ software, used on the host computer, allows data compaction in one or two dimensions. One-dimensional compaction reduces the amount of data to be transmitted by several times over vector data. Two-dimensional compaction further reduces data volume by 20 to 60 percent. The 440-30 can output print data at speeds to 1000 LPM. Plot speed is determined by transmission rate, plot size and complexity, available host time and selected data compaction scheme.

A console with CRT display and keyboard provides "sign-on" and versatile operator control at the remote site. Console and printer/plotter can be active simultaneously. Multi-leave allows console data input independently of console data output.

For more information check the reply card box for "440-30 Multi-Leave Remote Plotting Controller." ■

Cutting A-V Costs Drastically

Xerox Corporation is integrating the Versatec V-80 printer/plotter into the Xerox 350 Color Slide System, which allows users in both internal business graphics environments and in external graphics houses to produce high-quality 35mm color slides at a fraction of the time and cost of traditional methods.

Users of the Xerox 350 CSS create slides on a keyboard and CRT using programmed typography, color and special effects. They then transmit the slide data over standard telephone lines to one of several Xerox Reproduction Centers where the electronic data is turned into slides. The user is guaranteed an average turn-around time of 36 hours for finished slides at an average cost of \$35 each. Traditional methods of producing slides average \$100.

Many users want local hard-copy devices for a record of the slide information. The Versatec V-80 printer/plotters utilize a unique dot pattern density to indicate color definition of the slides.

Business forecasts indicate the market for color slides to be growing at a rate of 20 percent a year. ■

One Hour Delivery Time In All Locations

Xerox's product engineers are benefitting from a complex systems network that allows them to store, retrieve, exchange and plot their designs at any of Xerox's several locations in Webster, New York, and its other offices in Monroe County. And Versatec is an integral part of that system.

"It once took anywhere from 12 to 24 hours for an engineer to get hard copy of a design," says Bob Wolf, manager of software development. "Now an engineer can receive a design in less than an hour."

The design and drafting of Xerox copiers is performed on 10 turnkey systems at Xerox's Wilson Center for Technology in Webster. Each has three work stations. Wolf explains that the systems design group programmed a communications base to link and store any creative graphic information input to each system. All the design data is then transferred to Xerox's MDGS system for storage.

"We're the first to link information on the turnkey systems — Applicon and Computer-vision — in this way," says Wolf. "There has been a lot of interest in what we're doing."

Three Versatec 36-inch plotters, each run by a separate PDP-11/34 minicomputer, are able to plot any design information stored in the MDGS.

"A draftsman at any one of our locations can call and get hard copy of any design in storage," says Wolf. "A plot can be run on the Versatec unit nearest his office, or he can have a plot sent to someone else in a remote building."

Data is sent over 9600 bit per second communication lines from MDGS to the specified PDP 11/34 which drives the Versatec plotter.

Before this retrieval and exchange method was developed, completed engineering drawings were delivered and exchanged among Xerox's many locations by courier. ■

An Award Winning New Series

Versatec's V-80 printer/plotter was a recent exhibit winner at the 36th Annual Conference of the Reinforced Plastics/Composites Institute, held in Washington, D.C. February 16-20.

The V-80 is a new generation of hard copy output devices designed for computer, office equipment and instrumentation systems. Introduced by Versatec last year, the V-80 won its award for excellence of design and application in the business equipment category.

Lightweight and low profile, the V-80 can be placed on a desktop, carried on an

optional stand, or be recessed in a computer system console. It prints 1000 132 column lines per minute and plots an 11 x 8½-inch plot with 200 points-per-inch resolution in seven seconds. With an optional controller, it can produce hard copy from CRT or video source in 20 seconds or less.

The V-80 was exhibited by Premix, Inc., who molded the printer/plotter's housing. It was judged on such criteria as advance of manufacturing art, quality, innovative use of material, uniqueness of design, commercial value and originality. ■



Random Element Processor Optimizes Plotting Speed

The Versatec Random Element Processor (Model 710), a microprocessor-based accessory for electrostatic plotters, completely offloads host computer data ordering and raster conversion. Optimized to perform plot processing, the Random Element Processor drives Versatec plotters at high speed for better quality non-stop plotting and faster response to plotting requests. Particularly viable in multi-terminal systems, the Random Element Processor eliminates response time degradation caused by host computer data ordering and rasterization. Faster processing (as much as 25 times faster than a mid-sized minicomputer) reduces total plotting time to improve turnaround and throughput.

Representation of graphic data in new Versatec Random Format (VRF) enhances plot processing efficiency. The new format represents data in a more powerful

"element" form. Rather than traditional vectors, Versatec Random Format represents plots in elements of move and draw commands, text strings, areas, and pen and fill commands. This reduces the amount of data to be processed and the associated requirements for memory and data output.

Versaplot™ Random software, a system of FORTRAN-callable subroutines runs on the host computer, supports plotting of virtually any graphic representation on most Versatec plotters or printer/plotters. Extended graphic capabilities include grid overlay, area shading and toning. The software also performs banding on the host computer if processed "elements" exceed the 512K bytes of memory in the Random Element Processor.

For more information, check the reply card box for "Random Element Processor". ■

TRW Chooses Versatec For Creating Space Systems

With everyday life in outer space evolving from science fiction to reality, the creative design and reliable manufacture of satellites, space shuttles and stations is crucial to the U.S. space program.

TRW was the first industrial organization to design and build a spacecraft (Pioneer 1, launched in 1958) and is one of the major aerospace contractors to utilize computer aided design (CAD) and Versatec equipment in the creation of spacecraft and space systems.

The company's Space Systems Division in Redondo Beach, California, has been using an IBM computer system, CADAM software and a Versatec 36-inch plotter in its Design Analysis Center for over a year.

TRW provides broad support to NASA's Space Shuttle program. The aerospace contractor designed and developed the orbiting communications hardware and systems engineering for Space Shuttle's telecommunications system. It also developed the Tracking and Data Relay Satellite System which will transfer data to and from the shuttle, other earth-orbiting spacecraft and the earth station.

"This is the Design Analysis Center's first big push into CAD," says Tom Heim, design manager. "Before utilizing this system, most of our drawings were done by hand. There has been a five to one increase in output for the average user since we began using CADAM.

"We produce quality drawings plotted on the Versatec unit for mechanical and design engineering," Heim explains. "These plots go directly to manufacturing."

Specific examples of the kinds of space product designs plotted on the Versatec unit include antennas and reflectors for satellites. All of the Center's work is contracted as internal research for NASA and the U.S. Government.

Draftspeople, engineers and analysts input design data through thirteen terminals — four in the Design Analysis Center, and nine located throughout Space Park. The IBM 3032 computer system is located remotely to all sites in another building.

Heim says that the Space Systems Division's need for remote plotting is the main reason the Design Analysis Center chose the Versatec unit.

"The competitors simply were not able to remote their plotters," he says.

Heim adds that TRW has utilized several Versatec 11-inch printer/plotters in the past. The move to Versatec's wide plotter



"Computer aided design doesn't replace people," says Tom Heim of TRW. "It improves productivity." This 36 inch plotter is one of several TRW utilizes in the design of aerospace equipment.

line was a result of the company's satisfaction with Versatec products.

"Some companies worry that CAD will cut down on the number of people they employ," says Heim. "CAD doesn't replace people. It improves productivity. We can take on more work."

Recently the same Versatec 36-inch unit has begun plotting information produced with NASTRAN and other analysis software. These plots are used for finite element modeling, a computerized process of breaking up hardware design into shells, bars and rods to test for structure and dynamics. Heim also plans to take advantage of the remote capabilities of Versatec by interfacing the system to TRW's Control Data Network for general engineering applications.

The Design Analysis Center uses about 14 hours of computer time each day. Heim estimates the Versatec unit is plotting only ten percent of this time.

"The number of terminals we're using will double and redouble until the plotter is in full-time use. Then the Design Analysis Center will probably be getting more plotters," he says. ■

Versatec On Display

Versatec's role in the field of computer graphics will be demonstrated at two national trade shows this summer. The Versatec exhibit at the National Computer Graphics Association (NCGA), Baltimore, Maryland, June 15-18) and at Siggraph (Dallas, Texas, August 4-7) will display Versatec's V-80 printer/plotter, the new Random Element Processor, Versatec wide plotters and off-line and remote processing equipment.

These two major shows follow Versatec's participation in the National Computer Conference in Chicago earlier this month as well as Hanover Fair in Germany and Canada's National Petroleum Show.

Versatec will continue to exhibit throughout the world this year:

June 11-21 Expo Oficina '81, Buenos Aires, Argentina

June 15-18 National Computer Graphics Association (NCGA), Baltimore, Maryland

August 4-7 Siggraph, Dallas, Texas

October 11-15 Society of Exploration Geophysicists (SEG), Los Angeles, California

November 10-12 CAD/CAM, Autofact Show, Detroit, Michigan

November 10-12 Canadian Computer Conference, Toronto, Canada

FEATURE:

Understanding Our Environment: Versatec Plots Some Answers

Throughout history we have tried to conquer our environment: we have explored the land, exploited its resources and attempted to mold our surroundings to fit our purposes. But the importance of understanding the environment and the long-lasting effects of culture on nature are relatively new concerns.

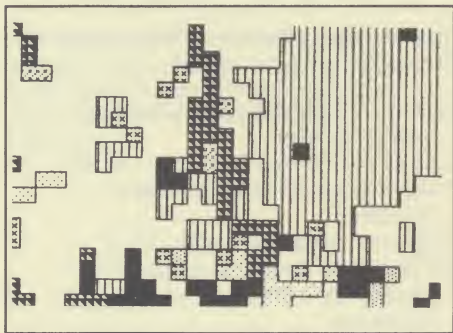
Environmental studies take many forms, such as research, cartography, mapping and analysis. The following examples highlight some current efforts in environmental studies. Versatec technology plays an integral role in each application.

Environmental Systems Research Institute:

Planning for the Future

Awareness of the importance of environmental planning is taking place throughout the world. A province in Venezuela sought environmental studies when planning a new town for workers. The U.S. Forest Service needed help in analyzing natural and cultural data for recreational development of the San Bernadino National Forest. Mobil Oil wanted an environmental assessment of strip mining and reclamation planning in central Florida. The People's Republic of China sought a seminar on geographic information systems for environmental studies.

Over the past 12 years, clients throughout the United States and in over 20 foreign countries have found such assistance through the Environmental Systems Research Institute. The Redlands, California based company is unique in its combined philosophy and services: to provide decision-makers with the information to make important environmental choices wisely. ESRI believes that each decision



This wetlands map of the Susitna River Basin was produced on a Versatec 22-inch plotter by Environmental Systems Research Institute.



Logan Hardison (left) and ESRI founder and president Jack Dangermond use the output from their Versatec plotter for finished maps.

concerning the use of natural and cultural resources has a profound affect on the future.

The company has developed the latest technology in geographic-based information systems and uses these techniques in the interpretation and mapping of environmental and land use data. This technology includes Versatec equipment.

Hosted by a Prime computer, a Versatec 22-inch plotter assists the team of specialists in regional planning, image processing, remote sensing, computer science, earth sciences, biology, and sociology in solving geographic problems.

"We use our Versatec plotter for grid plots and for displaying the suitability of land areas for certain types of development," says Logan Hardison, associate director of ESRI.

"Although color plots are dramatic and get a lot of attention, we find that for generalized qualitative mapping the gray-scale displays are better understood when determining the best areas and routes for development."

Two years ago ESRI began selling turnkey hardware/software systems. Three of the twelve systems installed in the U.S. also incorporated Versatec units.

"We find that the visual quality and flexibility of Versatec output is superior to

the line printer we used to use for grid plots," says Hardison.

ESRI believes that computer graphics and mapping have become particularly valuable in portraying geographic relationships. Large scale mapping projects may involve integrated information on geomorphology, vegetation, forest, soil, land use, human settlements, and other parameters. Most of the Versatec output is used for finished maps and models.

Environmental planning and assessment will continue to be of vital concern in every kind of resource management. The volumes of data necessary for these studies is easier to analyze in graphic form. The role that Versatec plays in the services provided by ESRI—that of displaying complex data graphically—provides an important aid toward better, more informed decision-making.

U.S. Forest Service:

Calculating the Elements

Environmental considerations such as soil types, erosion factors, and weather conditions are vital to the development of transportation networks in our protected areas.

Versatec is literally paving the way for the roads and highways built throughout many of the nation's forests. At the U.S. Forest

Service Engineering Center in Pleasant Hill, California, a 24-inch Versatec plotter gives graphic value to information detailing and analyzing strengths of materials used in pavement design.

The Versatec plotter, which was installed in Pleasant Hill three years ago, is also used for thematic mapping, slope maps and geologic contouring. The Forest Service has found that the Versatec unit has the accuracy and resolution necessary for their reproduction needs.

A Hewlett-Packard 2100S minicomputer utilizes a Chevron Five-layer software program to perform the multi-layer elastic analysis. Several factors—projected use, strength and type of soil, weather condition—are taken into consideration when calculating the stresses and strains on different combinations of materials considered for pavement design.

The Chevron software program simulates each layer of pavement and calculates its resistance to various stresses. There are three variables for each layer which are difficult to display on a two-dimensional system, but intersections of lines on the Versatec output can display several variables at once. A grid routine and annotation are used to complete the information.

The amount of time needed by the computer to generate this report is about 16 hours, but plotting time on the Versatec unit is only about 1½ hours and averages 24 pages of copy. Before the U.S. Forest Service started displaying this information graphically, the same data was output as approximately 1500 pages of print-out.

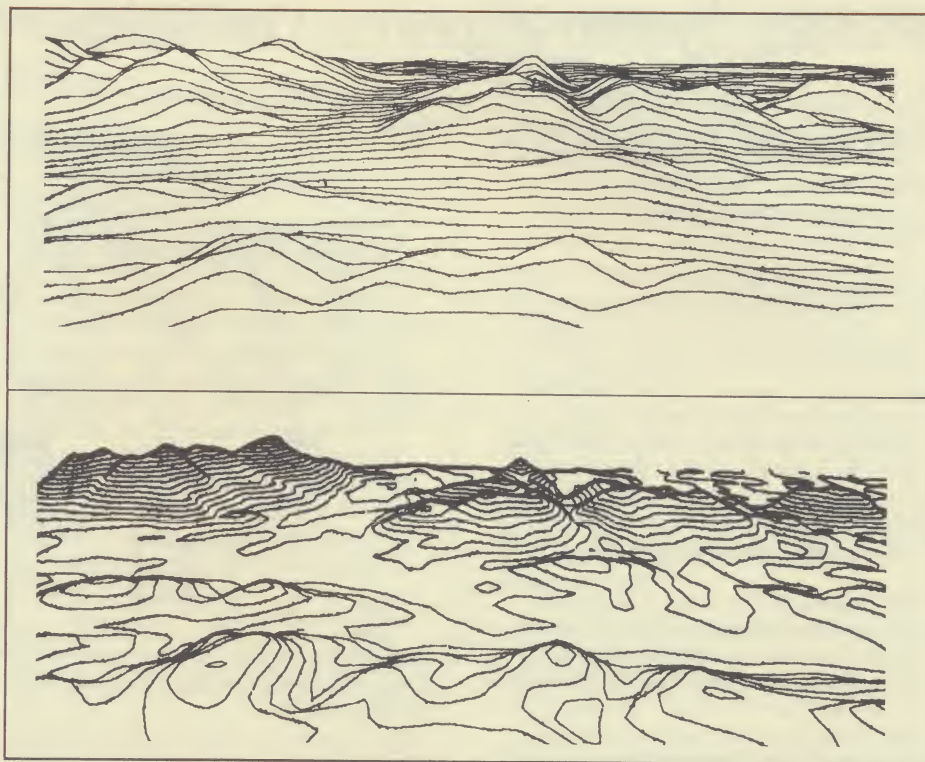
The U.S. Forest Service gathers much of its own geographical information for mapping through land and air survey methods. Additional mapping data is supplied by the U.S. Geological Survey. The plotted information aids the federal government in land use planning. For instance, some mapping applications help in learning how to repair or prevent damage caused from floods, land slides and erosion.

The ability of Versatec equipment to produce tones, patterns and shading is an important feature for the U.S. Forest Service operation. Since its computer center operates only one shift, five days a week, the speed of throughput offered by electrostatic plotting is another advantage.

Automated Cartography:

Exploring the Terrain

The sophisticated cartography and mapping operation at the Automated Cartography branch of the U.S. Army Engineer Topographic Laboratories includes a 24-inch Versatec plotter, Versatec software and Versatec Gray Scale software.



Range and contour plots of the same area were produced by Automated Cartography on a Versatec 24-inch plotter. Versaplot and Versatec Gray Scale are part of a process that combines plots on raster disks and produces a three-dimensional view of software terrain.

Richard Rosenthal, cartographer at Automated Cartography, has devised a way to merge Versaplot and Versatec Gray Scale on a raster disk file to create three-dimensional maps.

"We investigate novel and unique approaches to depicting the terrain. We've gone beyond contour maps."

This is how Richard Rosenthal, cartographer in the Automated Cartography (AUTOCARTO) branch of the U.S. Army Engineer Topographic Laboratories, (ETL) describes his work.

Located at Fort Belvoir, Virginia, ETL applies the latest advances in optics, electronics, automatic data processing, space sciences, and related technologies to military and civil problems in mapping, surveying, land navigation, geodesy, and a host of other fields.

Among their research efforts, AUTOCARTO scientists develop computer software to create unusual maps from computer-stored digital terrain models.

"We use the power and flexibility of computers to produce three-dimensional maps of the Earth's surface," explains Rosenthal. "Unlike contour depictions, a 3-D graphic enables a map user to readily visualize the Earth's relief characteristics."

AUTOCARTO's development of exploitive

software takes place on a PDP-11/45 minicomputer. Graphic output is accomplished with any of several soft-copy and hard copy devices including film and electrostatic raster plotters.

Present software development is directed towards computer implementation of analytical hill-shading techniques. However, unlike typical shaded relief maps, AUTOCARTO's software generates shaded perspective terrain views. The generated continuous-tone terrain views may be digitally halftoned to produce a bi-level raster image. This image is suitable for output on the raster plotters.

Additional graphics software creates perspective views consisting of symbolized planimetry in vector form. Included are streams, roads, and vegetation outlines. A raster image of the symbolized planimetry is constructed by way of vector-to-raster conversion.

Using software that Rosenthal developed, the raster images of a shaded terrain model and symbolized planimetry are combined. The resulting composite image is subsequently plotted as a complete graphic.

"Digital merging of terrain graphics and symbolized planimetry is simple when they have been converted to raster images," says Rosenthal. "In this way we are able to quickly produce a novel, readily visualized, computer-generated, three-dimensional map."

Plotting System Improves Throughput Four Times

The Lockheed-California Company, a designer and manufacturer of military and commercial aircraft for over 50 years, is using a Versatec 36-inch wide plotter to accelerate the internal design process for its products.

Reconnaissance planes such as the U-2 and SR-71, the P-38 World War II fighter, the first pressurized passenger plane (Constellation), and the Electra, which was the first Lockheed turbo-prop, are among the innovative aircraft introduced by this Lockheed Corporation division in Burbank, California. Today as many as 29 terminals are used simultaneously to input aircraft design data to the Versatec plotter installed in the company's design computer center.

"Our Versatec plotter is in use nearly 50 percent of our 13 hour day," says Elersich. "All the information stored by engineers and draftspeople is plotted and distributed to their various departments. We're accomplishing four times as much with this plotting system than with previous systems."

Designers input data through IBM 3250 or Adage 4250 terminals. An IBM 3031 is the host computer. All of the input specifications are for interiors (galleys, floor panels, closets) of military and commercial aircraft.

Two new products, the U.S. Air Force's TR-1 tactical reconnaissance plane and NASA's ER-1 earth resource craft, and upgrades for the L1011 commercial aircraft and P-3 and S-3 military transports are the principle Lockheed aircraft being designed in the center.

"Our galleys are total CADAM in design," says Elersich. He adds that the Versatec plotter, installed nearly two years ago, allowed the center to start a new design system.

"Lockheed used to release the same data on COMCARDS. We had to contract out to get a pen plotter to do the same thing our Versatec is doing now. The time and money involved was killing us.

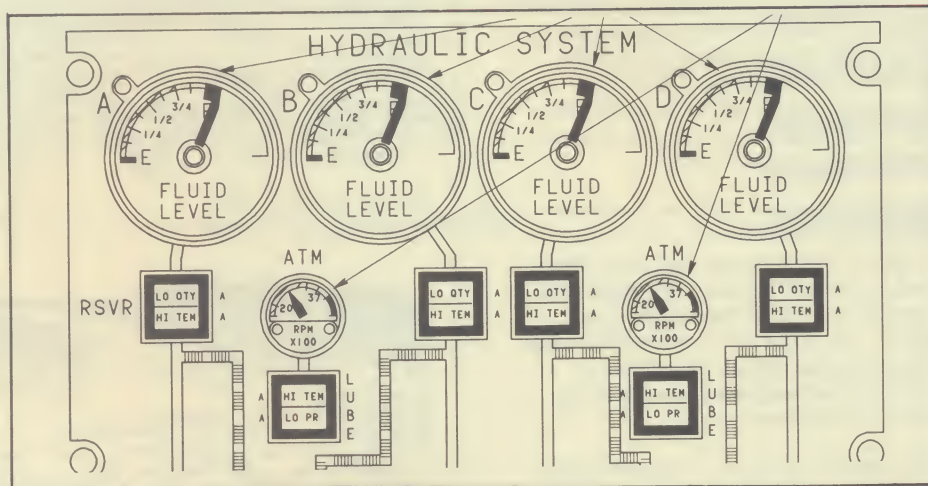
"For instance, before we installed the Versatec plotter, it would take us 24 hours to make a design change. With Versatec, we have the change in front of us within an hour."

Elersich adds that one design may require 600 drawings and some drawings are as long as 12 feet. Each design takes about three months from concept to finished plot for manufacturing.

"With Versatec's 200 point per inch plot capability, we can use these plots for re-

lease drawings to manufacturing," says Elersich.

"Versatec gives us the versatility we need to be dynamic in design standards." ■



Lockheed-California Company's 36 inch Versatec wide plotter has greatly accelerated the design process for aircraft interiors.

Your Favorite Plots

The Empire plots back, courtesy of Autotrol of Denver, Colorado. Yoda, the Jedi Master has been captured by Autotrol designers on a Versatec wide plotter. Will Luke Skywalker join his Master? Will Jim Henson discover one of his

muppets is missing? Watch this column in the next issue of **HARD COPY** for the exciting sequel. In the meantime, if you have a small favorite plot or even a large "Chewy" one—send it to **HARD COPY**. We'll make you famous. ■



Remote Plotting Work Station Offers Remote Graphics Manipulation And Plotting

The new Versatec 444 Remote Plotting Work Station supports remote job entry, electrostatic plotting/printing and graphics manipulation capability — scaling, rotation, mirroring, windowing. The system accepts unsorted vectors in the new Versatec Random Format (VRF) as well as sorted vector, compressed raster, raster and print data formats. Emulating HASP multi-leave remote work stations, the system provides IBM software and system protocol compatibility without requiring modification of the operating system.

Work Station components include micro-processor with 64K bytes of memory, CRT display, 24-megabyte disk, and bipolar algorithmic processor (BAP) designed specifically to perform vector sorting and raster generation. The system will support any two Versatec printer/plotters in any mix of paper widths.

A console with CRT display and keyboard provides host command input and response, "sign-on" inquiry, cancel and queue control. CRT displayed menus enable users to define plot parameters, create canned sequences and perform graphics manipulation. Data received in Versatec Random Format (VRF) can be scaled, translated, windowed, mirrored and rotated in one degree increments. Multiple copies can be produced without re-sorting data. The system can generate up to 15 different font styles and assign pen numbers to create different line styles and widths. Data is

received over dial-up or leased lines at speeds of 2400-9600 bits per second.

Versaplot™ software, a system of FORTRAN-callable subroutines run on the host computer, supports plotting of virtually any graphic representation on any Versatec plotter or printer/plotter. Fully compatible with IBM software and system protocol, Versaplot is fully integrated for use with IBM OS, VS and CMS operating systems and requires no operating system modification. Extended graphic capabilities include grid overlay, area shading and toning.

Output devices available include electrostatic printer/plotters in paper widths to 72 inches, print speeds to 1000 LPM and plot speeds to 34 square feet per minute. Remote plotting performance varies with the speed of the communications line and plot complexity.

According to Versatec product marketing manager, Janet Berryhill, "The 444 Remote Plotting Work Station gives remote plotting users the speed and reliability of electrostatic plotting and printing without requiring additional host processing time. The new Versatec Random Format (VRF) requires less data for plot representation to reduce data transmission time. It also gives users an easy-to-use work station for graphics manipulation and copying."

For more information, check the reply card box for "444 Multi-Leave Remote Plotting Work Station." ■



Improved Services Offered By Supplies Division

The Versatec Supplies Division added two new departments to its organization recently. The departments, quality control and technical support, will be providing services that were previously performed by Versatec's material research and quality control departments.

"We need to totally control what we're doing," says Russ Hebert, general manager of supplies sales. "Supplies is a rapidly growing division, and we need experts to work with customers, vendors, and Versatec field people on technical and quality assurance matters."

Fortunately, both departments are headed by people who have already worked extensively with Versatec's output media and toners.

"Rita Hernandez is one of the most capable technical people we have here at Versatec," says Hebert of the new technical manager. "She has an excellent understanding of our equipment in addition to supplies products."

Hernandez, who worked closely with the Supplies Division in her former position as senior chemist, says she plans to participate actively in product development.

"Any supplies activity relating to technical support, packaging, field complaints, or image quality come to me," says Hernandez.

Fred Housel, who provided quality assurance support to the Supplies Division before being asked to head its new quality control department, says he will be responsible for testing and inspecting all supplies purchased by Versatec for resale. He will also handle any quality complaints from customers.

"There is more competition and more emphasis on quality today than ever before," explains Housel. "We want to make sure Versatec maintains its quality lead in the marketplace."

"We have some highly challenging quality programs in mind," says Hebert.

For more information on Versatec supplies, check the reply card box for "Supplies Brochure." ■

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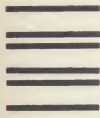
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